Space Weather Forecast

Issued on Friday 21 March 2025 at 01:28 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of isolated Moderate class flares. Chance of G1-G2/Minor-Moderate Storms throughout, due to coronal mass ejection arrivals, and later faster solar winds.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low, with only Common class flares. There are currently eight numbered sunspot regions on the visible disc, with also several very small and weak unnumbered spots. Of the numbered regions the main ones of note are relatively modest in size, geomagnetic complexity and activity. Remaining regions are small, simple and mainly stable.

Two Coronal Mass Ejections (CME) were observed that may have Earth directed components, and analysis is being undertaken with available imagery.

Solar Wind / Geomagnetic Activity: Solar winds gradually declined from slightly elevated levels to background levels, falling from 490 km/s to around 390 km/s. The strength of the Magnetic Field, was weak, with the north-south component also weak and favouring a southward orientation early and late in the period. Geomagnetic activity was Quiet.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Generally Low activity is expected, with a chance of isolated M-class flares.

Solar Wind / Geomagnetic Activity: There are three potential CMEs which feature in the forecast in the coming days (21-24 Mar), with a possible addition from one of the CME's observed on the 20th. Solar winds are likely to remain mostly at background levels at first, but with slightly elevated to elevated enhancements possible due to forecast CME arrivals. In addition a further solar wind enhancement is possible Day 2 (22 Mar) from a coronal hole feature in the western hemisphere. Generally Quiet activity is expected initially, with a chance of Minor-Moderate storms throughout should any of the possible CMEs arrive, combined with the coronal hole enhancement.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to persist at background levels, with a slight chance of enhancement from any larger flares.

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Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	40	40	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	No	30	30	30	30
Very Active	R3-R5 (X Class)	No	1	1	1	1

Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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